



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Edward T. LeBreton
Appln. No. : 10/074,449
Filed : February 13, 2002
Title : FIBER REINFORCED THERMOPLASTIC PRESSURE VESSELS
Conf. No. : 8968
TC/A.U. : 1732
Examiner : Stefan Staicovici

Customer No. : 000,116
Docket No. : 32285

Mail Stop Amendments
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.131 ESTABLISHING PRIOR INVENTION

We, as inventors in the above-identified patent application, hereby declare as follows:

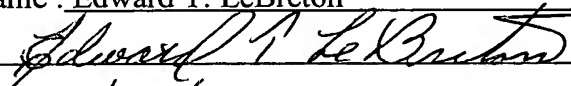
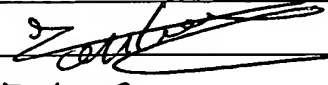
1. Our residences, post office addresses, and citizenship are as stated below next to our names.

2. In the United States, prior to January 9 , 2001, Robert F. Bodi, our attorney, upon information and belief, created a memorandum and an initial set of claims, hard copies of which are attached hereto, from information previously provided to him by us about our invention. The information about the invention was provided by us to our attorney via oral descriptions, written materials, and a demonstration of aspects of the invention along with prototypes. These memo and claims are maintained by our attorney as electronic files that have original modification dates (i.e., creation dates) prior to January 9, 2001, and thus were created, prior to that date, from information provided by us to our attorney.

3. Upon information and belief, the attached memorandum and initial claims support the invention of at least claims 36 and 42 of the above listed patent application.

4. The attached memorandum and claims are evidence that the invention and its conception, at least according to claims 36 and 42, was in our possession prior to January 9, 2001. Specifically, with reference to the cited claims, the invention, as disclosed in the attached memorandum and initial claims, includes a method of manufacture of a pressure vessel by assembling preform components including a discrete domed portion, domed bottom portion, and sidewall portion, with a core inserted therein being inserted into a mold and then pressurizing the core during heating of the mold to uniformly distribute thermoplastic material in the preform, and then depressurizing the core, cooling the resulting article, removing the resulting article from the mold, and then optionally removing the core, as recited in the cited claims. Thus, the attached memo and initial claims clearly support the invention as claimed by claims 36 and 42.

5. All statements made herein of our own knowledge are true and all statements made on information and belief are believed to be true; and further these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

- 1) Inventor Name : Edward T. LeBreton
Signature: 
Date: 1/13/06
Citizenship: USA
Residence (City, State, Country): MENTOR, OHIO USA
Post Office Address: 7806 LOW RIDGE LANE
- 2) Inventor Name : Koen Vanherck
Signature: 
Date: 01/27/06
Citizenship: BELGIUM
Residence (City, State, Country): DESSEL, BELGIUM
Post Office Address: TURNHOUTSEBAAN 129

Attachments

Attachment 1: Memorandum:

Summary of the Invention

The present invention describes a method of manufacturing hollow, reinforced plastic articles typically used to contain gasses or liquids.

The article is manufactured by starting with a perform made up of reinforcing fibers intermixed with a thermoplastic material used to bind the reinforcing fibers together. The fiber to thermoplastic ratio may be optimally chosen for durability, workability and strength, and may be constant, or it may vary along the length of the preform. The thermoplastic material originally utilized in the perform may be in powder, fiber, or liquid form, and may be of a polypropylene, or some other binding material. The reinforcing fibers may be of glass, or some other material. The perform thickness may be substantially constant or vary along the length of the perform.

The perform has a cylindrical sidewall portion, a domed bottom portion, and a domed top portion. The domed bottom and top portions may be separate from the cylindrical portion. The domed portions may include bosses, inserts, threaded seats, and other pre-formed components. Other perform portions may similarly be added separately to other areas of the perform to add additional components and features.

The perform is positioned into a rigid mold having a cylindrical sidewall portion and domed end portions, corresponding to the perform portions.

An inflatable core is contained within the perform, also comprising cylindrical sidewall portions and domed end portions. The core is inflated to compress and hold the perform in place within the mold, while the perform is heated within the mold, sufficient to melt the thermoplastic material. The pressure within the inflatable core is increased during this melting process in order to maintain the distribution of thermoplastic material throughout the perform, providing a void-free fiber reinforced molded article.

The article is then allowed to cool within the mold until the thermoplastic material is substantially solid, The article is then easily removed from the mold. The article is now ready for further conditioning or treatment or perhaps even for its final purpose.

The core may be coated with adhesive materials to ensure that the core binds with the perform.

Attachment 2: Initial Claims:

What is claimed is:

1. A method of making hollow, reinforced plastic articles, comprising:
 - a) providing:
 - i) a hollow preform of reinforcing fibers intimately intermixed with a thermoplastic material, said preform having a cylindrical sidewall portion, a domed bottom portion and a domed top portion, and
 - ii) a rigid mold having a cylindrical sidewall portion and domed end portions corresponding to said preform portions;
 - b) positioning said preform against the inner surface of said corresponding mold portions;
 - c) compressing said preform with an internally pressurized, inflatable core having a cylindrical sidewall portion and top and bottom dome portions to hold said preform in place;
 - d) heating said preform sufficient to melt said thermoplastic material while increasing the pressure in said inflatable core to compress said preforms and maintain the distribution of thermoplastic material throughout said preform, to provide a void-free fiber reinforced molded article;
 - f) cooling said molded article until said thermoplastic material is substantially solid;
 - g) removing said molded article from said mold.
2. The method of claim 1 wherein said hollow preform comprises a separately preformed sidewall and bottom portion and a separately preformed top dome portion.
3. The method of claim 1 wherein said hollow preform comprises a separately preformed cylindrical sidewall portion and comprises separately preformed domed portions.
4. The method of claim 3 wherein said cylindrical sidewall portion is formed from a rectangular blanket of said reinforcing fibers intimately intermixed with said thermoplastic material, said blanket being positioned against said cylindrical sidewall portion with a slight overlap of opposite ends of said blanket.

5. The method of claim 1 wherein the ratio of glass fiber to thermoplastic material is substantially constant throughout said preform.
6. The method of claim 5 wherein said ratio is approximately 60:40.
7. The method of claim 1 wherein the ratio of glass fiber to thermoplastic material varies within said preform.
8. The method of claim 1 wherein the wall thickness of said preform is substantially constant.
9. The method of claim 1 wherein the wall thickness of said preform varies along its length.
10. The method of claim 1 wherein said reinforcing fibers are glass fibers.
11. The method of claim 10 wherein said glass fibers are approximately 1 inch in length.
12. The method of claim 1 wherein said thermoplastic material is polypropylene.
13. The method of claim 1 further comprising, prior the compressing step, treating the outer surface of said inflatable core with an adhesive agent so that said core is bonded to the interior of said molded article.
14. The method of claim 1 further comprising, prior the compressing step,
treating a surface of one of the top and bottom dome portions and an adjacent sidewall portion of said inflatable core with an adhesive agent to provide an adhesive coated portion; and
treating the a surface of the other domed portion and adjacent sidewall portion with a releasing agent to provide a release coted portion;
and, after the removing step,

disengaging the release coated portion of said inflatable core from an inner surface of said molded article while the adhesive coated portion remains adhered to an inner surface of said molded article.

15. The method of claim 1 further comprising, prior to the compressing step, treating the outer surface of said inflatable core with a releasing agent; and, after the removing step, removing said inflatable core from said molded article.

16. The method of claim 1 wherein said heating step comprises heating said preform to a temperature of 400°F and maintaining said temperature for a period of at least approximately 30 minutes.

17. The method of claim 1 wherein said increasing step comprises increasing the internal pressure of said inflatable core to approximately 25 psi.

18. The method of claim 1 wherein said thermoplastic material is provided in fibrous form.

19. The method of claim 18 wherein said fibrous form is approximately 2 inch length of thermoplastic material.

20. The method of claim 1 wherein said thermoplastic material is provided in powder form.

21. A method of making hollow, reinforced plastic articles, comprising:

a) providing:

i) a hollow preform of reinforcing fibers intimately intermixed with a thermoplastic material, said preform having a cylindrical sidewall portion, a domed bottom portion and a domed top portion, and

ii) a rigid molds having a cylindrical sidewall portion and domed end portions corresponding to said preform portions;

- b) positioning said preform against the inner surfaces of said corresponding mold portions;
- c) positioning a parison against the inner surfaces of said preform;
- d) compressing said preform and parison with an internally pressurized, inflatable core having a cylindrical sidewall portion and top and bottom domed portions, to hold said parison in place against said preform;
- e) heating said preforms sufficient to melt said thermoplastic material while increasing the pressure in said inflatable core to compress said preforms and maintain the distribution of thermoplastic material throughout said preform, to provide a void-free fiber reinforced molded article;
- f) cooling said molded article until said thermoplastic material is substantially solid;
- g) removing the molded article from the mold.